Institute for Healthcare Improvement

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Oslo, Norway

Reliable Design

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Patient Safety Framework

- Psychological Safety
- Accountability
- Teamwork & Communication
- Negotiation
- Continuous Learning
- Improvement & Measurement
- Reliability
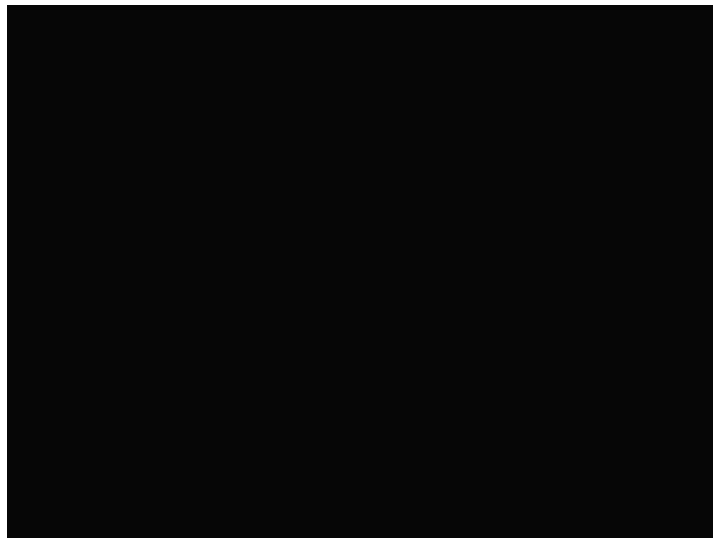- Transparency
- Leadership
- Engagement of Patients & Family

Culture

Learning System
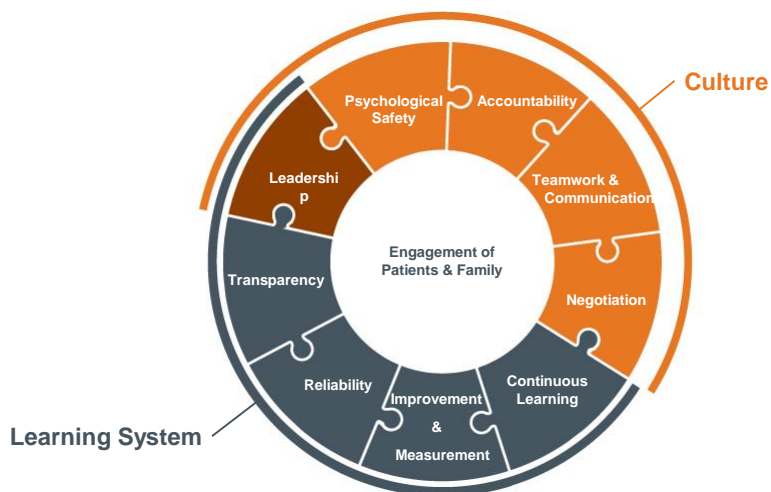
Human Error is Normal

YOU HAD ONE JOB!

LOOK LEFT →

Stuck……

Think of a Process You Believe is Reliable

- Define what you mean by reliable

- Name the process

- What do you think makes the process reliable?

Examples of Reliable Processes

- Airline industry
- Automobiles
- Starbucks
- Nuclear Submarines
- Others…..

What Makes Processes Reliable?

- Deliberate design

- Focus on reliability

- Testing-testing-testing

- Measurement-measurement-measurement

Why Are Processes Not Reliable?

- Individual Autonomy
  - *"The record shows I took the blows*
    And did it my way
    Yes, it was my way" Frank Sinatra

- Focus on benchmark performance

- Over-reliance on training, vigilance and hard work

- Expecting that a policy will result in improved reliability

The Reliability Design Strategy

1. **Prevent initial failure** using a clear definition of what you are trying to improve (intent) through simplification *and* standardization
   - Build in measurement system

2. **Identify defects** (using redundancy/back-up plans/contingencies) **and** correct/mitigate
   - Build in measurement system

IHI Reliable Design Methodology Getting Started

- Start small- subset/segment of the population
- Visualize the steps in the process using a high-level flow diagram
- Identify the defects in each step
- Lead with the change concepts of simplification and standardization
- Develop a 'back-up plan' or redundancy
- Test and measure; test and measure; test and measure
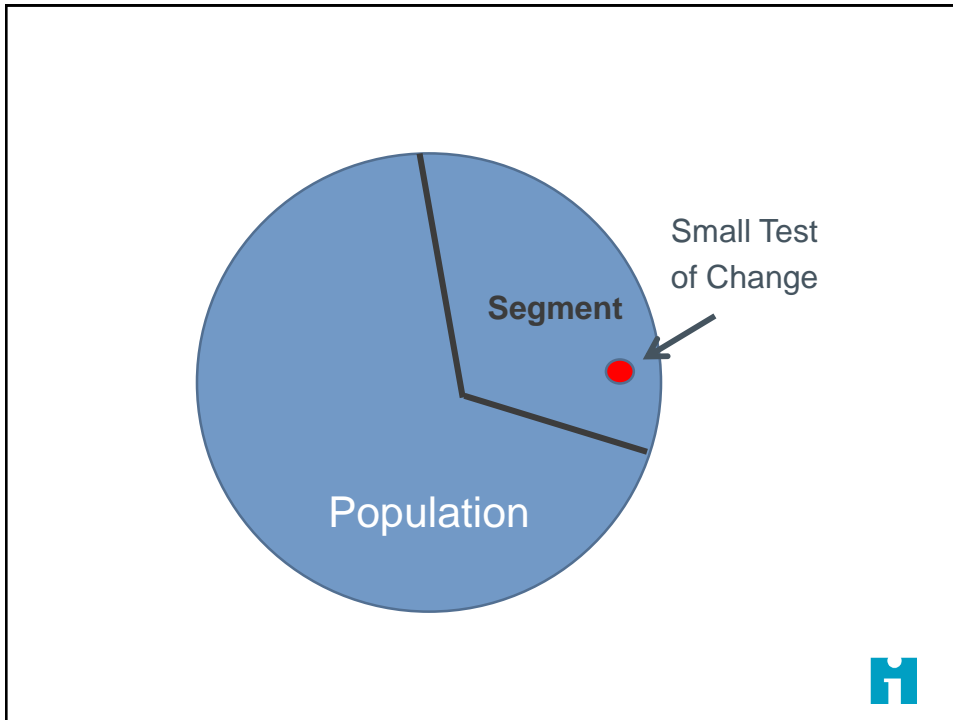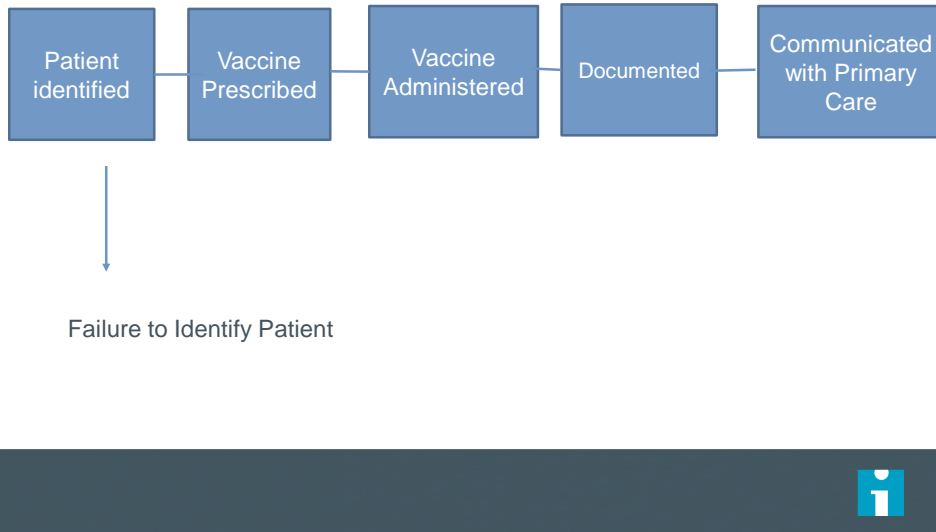
Visualize the Steps

- High level flow diagram

- 3 to 5 Steps-keep it simple

- Identify defects

  - Is there a cascade?

  - Which is the biggest defect?

  - Identify what you will fix

Example of High Level Diagram

Patient identified → Vaccine Prescribed → Vaccine Administered → Documented → Communicated with Primary Care

Failure to Identify Patient

Example: Ventilator Care Bundle "Set Up"
Segment: Medical ICU With 2 Willing Doctors

Patient placed on ventilator → **Elements of the bundle ordered** → **Elements of the bundle accomplished** → **Patient removed from ventilator**

Of the elements of the bundle, the head of the bed elevation is most commonly not accomplished

Our aim: achieve a 95% or better reliability at keeping the head of the bed elevated

Patient Safety Executive Development Program
Institute for Healthcare Improvement

What is your goal?

- At least 95% reliability for the process
- Why not 100%?
- Process must be capable and reliable
- Process must be linked to outcome
- Must be non-catastrophic process
  - If the process fails, the patient will not be harmed within next few hours
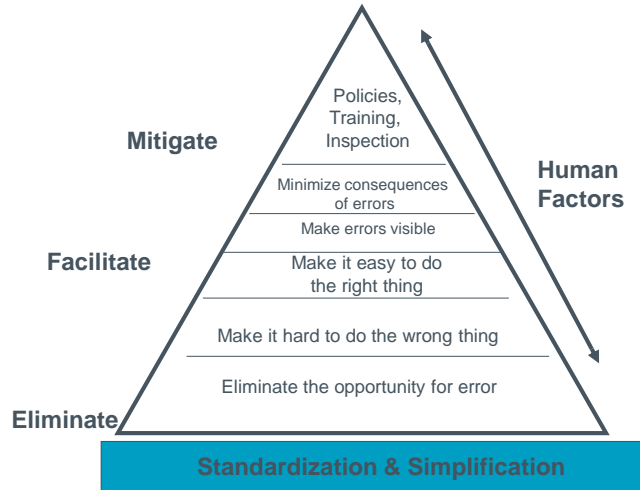
Why Some Improvement Efforts Fail

- We do not get to the root of the problem
- We do not understand human factors and engineer systems to deal with the human condition
- We do not simplify.
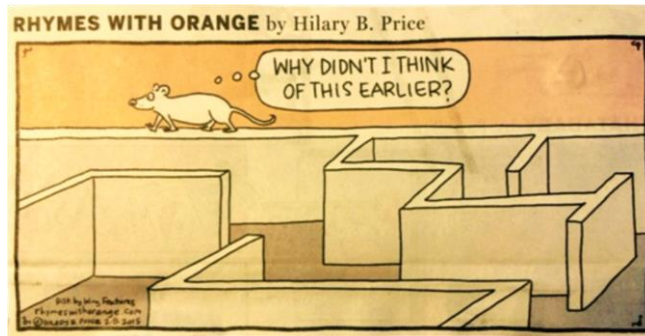- We add steps to the processes that result in increased work and complexity
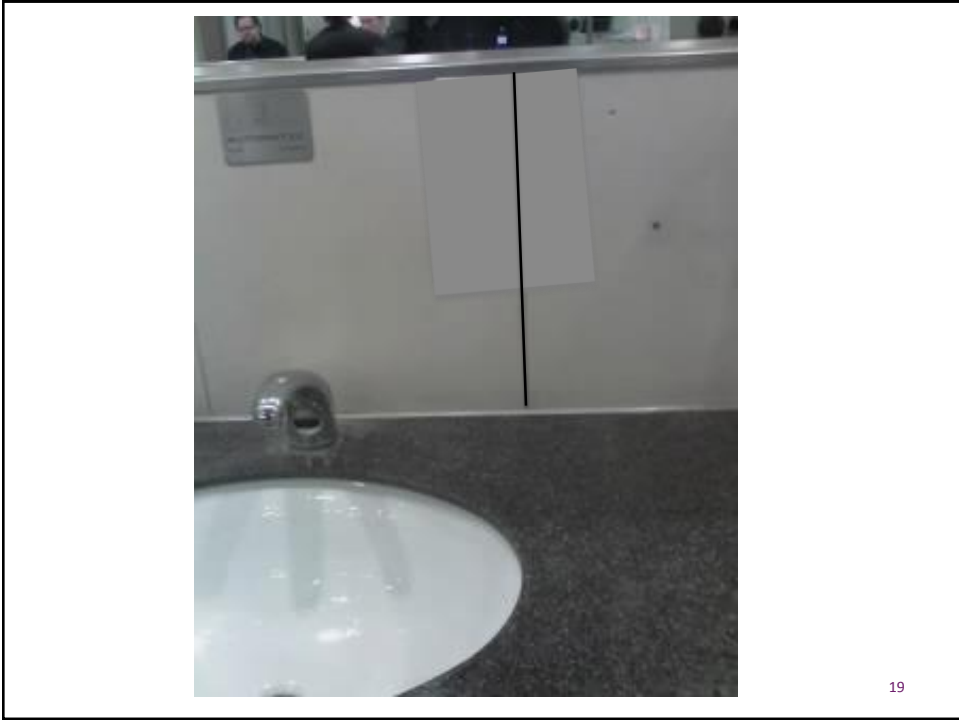
Frank's observations

Error Reduction Overview: Hierarchy of Controls

Mitigate

Policies, Training, Inspection

Minimize consequences of errors

Make errors visible

Facilitate

Make it easy to do the right thing

Make it hard to do the wrong thing

Eliminate the opportunity for error

Eliminate

Human Factors

Standardization & Simplification

Doug Bonacum, KP

RHYMES WITH ORANGE by Hilary B. Price

WHY DIDN'T I THINK OF THIS EARLIER?

19

WARNING
Very hot
water

20

Problem Solving

- First order Problem Solving

  – Fix the problem you see

- Second order Problem Solving

  – Solve the root of the problem

Step 1

Suggested focus…

- Reduce harm from venous thromboembolism….. Or any other area where you believe you have unreliable processes

- Link between aim -> driver diagram -> reliable work flow -> Model for Improvement -> measurement

- Action planning form: this is a method/tool to train staff/middle managers/leaders on how to improve

Getting Started

- Select process you want to make more reliable

- Develop a high level flow diagram

- Select subset or segment of population

- Identify defects in each step

- Select which defect you will fix first

- State your reliability goal
  - At least 95% reliable

Report Out

- Describe process you want to make more reliable
- Describe your high level flow diagram
- Describe the subset of the population
- Describe the defect you want to make more reliable
- State your reliability goal
  - At least 95% reliable

Step 2

Change Concepts

- Simplification

    – Are there Steps in your processes that can be eliminated?

- Standardization

    – Best known process to achieve desired results

    – But known today-may change with new knowledge or new

    context

How Do We Achieve Reliable Processes?

- Reduce variation (in order to reduce waste and increase value)
- Simplify and standardize processes
- Monitor over time

"If I had to reduce my message for management to just a few words, I'd say it all had to do with reducing variation."
W. Edwards Deming

Definition of standard work

"…current best practice, standardized work forms the baseline for kaizen or continuous improvement. As the standard is improved, the new standard becomes the baseline for further improvements, and so on. Improving standardized work is a never-ending process."

http://www.lean.org/workshops/WorkshopDescription.cfm?WorkshopId=20

Why Standardize?

- Makes it easier to fix a defect when one occurs

- Reduce variation

- Makes it easier to train

- Supports care we expect our patients receive

- Makes it easier to assess competency

How to Standardize

- Determine what you want to standardize and why
- Ask people who do the work to contribute ideas
- "Steal" ideas from others
- Test-test-test
- Measure-measure-measure
- Do not be afraid of giving up an idea if it does not work

Standardize the Process

- Who
- What
- When
- Where
- How
- With what

Report Out

- Describe the process you want to make reliable
- Re-examine the segment
- Describe the defect you are trying to fix
- Describe the process you test by answering:
  who, what, when, where, how, with what

Step 3

Why Develop a Back Up Plan?

- Very difficult to reach 100% each every time with only first step

- Allowing for 80% reliability in first step gives opportunity to design more freely

- You may achieve 95% or better with only first step-but is it sustainable?

- You will have a safeguard in place

Back Up Plan

- Develop your backup plan

- Standardize the process

- Try to incorporate into existing work flow

Standardize the Process

- Who

- What

- When

- Where

- How

- With what

When to move to this step?

- Standardization step must be at least 80% reliable overtime

- Do not introduce backup plan if first step is not reliable

When will backup plan fail?

- When it becomes the primary process

- When it never finds a defect in primary process

- When it becomes another function in our busy days

Measurement

- Needed to determine reliability of processes

- Sampling is useful

- Measurement alone does not result in improvement

Measurement of Step 1

- Select 5 to 10 events daily
- Plot over time
- Display charts
- Easy to do
- Collected by people who do the work
- Backup plan becomes our measurement when implemented

To Be Successful

- Leaders must insist that teams will focus on developing capable processes
- Teams will use an improvement method other than training and education, vigilance and hard work
- Teams will display and share data
- The project will have a reasonable time line
- Focus will be on processes that improve desired outcomes
- Teams will ask for help

How Many Segments

- No more than 4 or 5

  – Move on to next segment when first segment at least 95% reliable

  – Customize as needed

Key Questions To Analyze Testing and Implementation

Key Question	Your Evaluation
Is the connection between goals and process clear?	
Is the design strategy primarily vigilance and hard work?	
Has some degree of segmentation been used to test the design?	
Is standard work with testing been part of the design?	
Is a design methodology being used?	
Are small tests of change being used in a rapid cycle?	
Is data collection rapid enough?	

Key Questions To Analyze Spread

Key Question	Your Evaluation
Have you repeated the small test cycles as you spread from the initial site?	
Is the process of spread dependent on one person?	
Has some degree of segmentation been used to spread?	
Has customization been allowed or encouraged?	
Is the same team who developed the pilot now responsible for spread?	
Have you shifted your focus from process reliability to outcomes too early?	

Take a moment to reflect on the action plans you are creating.

What will you incorporate from this session into your action plan?